Variable Grid Method for Visualizing Uncertainty Associated with Spatial Data

Opportunity

Research is active on the patent pending technology titled "Variable Grid Method for Visualizing Uncertainty Associated with Spatial Data." This technology is available for licensing and/or further collaborative research from the U.S. Department of Energy's National Energy Technology Laboratory

Overview

The use of spatial data to develop maps and represent spatial relationships has a longstanding application in the scientific community. In fact, the use of spatial data in natural and engineered-natural systems has increased during the past decade. However, the challenge for users of spatial data has been in understanding the uncertainty associated with a given spatial dataset and the related products, such as maps, spatial layers, and spatial analyses. As a result, the data presented to users oftentimes may contain little identification of their inherent uncertainty.

The uncertainty manifests itself in a number of ways including variable data, errors related to accuracy and precision, human error, and equipment error, among other causes. Adding to the problem, these uncertainties are often difficult to quantify or are not reported. Since key decisions are often made based on the results of collected data, scientists require data that conveys both accuracy and uncertainty.

To accept this challenge, scientists have focused on developing geovisualization approaches that provide accurate data and also identify the associated uncertainty. To address the need, NETL scientists created an approach called the Variable Grid Method (VGM) that allows decision makers such as managers, researchers, and industry users to accurately identify spatial patterns and trends, as well as the uncertainty associated with the data and subsequent interpretation. In general, NETL's VGM applies a grid system where the size of the cell represents the uncertainty associated with the original point data sources or their analyses, as opposed to the current traditional system that uses the same grid size across the entire study to represent the original point data sources or their analyses and display uncertainty as a separate product.

Patent Details

A U.S. provisional patent application was filed February 12, 2014.

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Significance

- Provides an updated method to use spatial data

- Addresses the uncertainty inherent in data interpretation

- Enhances accuracy and effective communication associated with data interpretation

- Provides a variable grid system as a solution

Applications

- Any application associated with spatial data, such as those related to the geologic systems, energy production and exploration, natural systems (e.g., oceans, atmosphere, etc.), and anthropogenic systems (such as retail and sales, planning and development, agriculture, etc.)

- A decision-making tool for industry, government, academia, and scientists using spatial data

Contact

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